

**Table S1. Detailed Statistics of Electrophysiological Experiments, Related to Figures 6, 7, and S7**

Compared construct pair	n	Level of significance (***, P<0.001; **, P<0.01; *, P<0.05; ns, P≥0.05)
<b>Figure 6B: Difference between WT and mutant conductance</b>		
F55E/WT EAAT4 (+150 mV)	9/8	0.6938 (ns)
V12E/WT Glt <sub>ph</sub> (~+800 mV)	7/6	0.8486 (ns)
T59W/WT EAAT4 (+150 mV)	8/8	0.9001 (ns)
I16W/WT Glt <sub>ph</sub> (~+800 mV)	6/6	0.6719 (ns)
V63E/WT EAAT4 (+150 mV)	7/8	<0.0001 (***)
L20E/WT Glt <sub>ph</sub> (~+800 mV)	6/6	0.0044 (**)
T59K/WT EAAT4 (+150 mV)	7/8	<0.0001 (***)
I16K/WT Glt <sub>ph</sub> (~+800 mV)	6/6	<0.0001 (***)
T59E/WT EAAT4 (+150 mV)	9/8	0.2066 (ns)
I16E/WT Glt <sub>ph</sub> (~+800 mV)	6/6	0.5596 (ns)
L104D/WT EAAT4 (+150 mV)	9/8	0.0010 (**)
I61D/WT Glt <sub>ph</sub> (~+800 mV)	8/6	0.0327 (*)
S108A/WT EAAT4 (+150 mV)	8/8	0.3593 (ns)
S65A/WT Glt <sub>ph</sub> (~+800 mV)	9/6	0.7117 (ns)
T59E/WT EAAT4 (-150 mV)	6/6	0.0025 (**)
I16E/WT Glt <sub>ph</sub> (~+800 mV)	6/6	<0.0001 (***)
<b>Figure 6C: Difference between WT and mutant conductance</b>		
SRRM/WT EAAT4 (+150 mV)	8/8	0.0005 (***)
RSMR/WT Glt <sub>ph</sub> (~+800 mV)	6/6	0.0160 (*)
L93F/WT EAAT4 (+150 mV)	8/8	<0.0001 (***)
F50L/WT Glt <sub>ph</sub> (~+800 mV)	6/6	0.0077 (**)
M94V/WT EAAT4 (+150 mV)	6/8	0.0013 (**)
V51M/WT Glt <sub>ph</sub> (~+800 mV)	8/6	0.4943 (ns)
<b>Figure 7B: Reversal potential shift following changes in [Na<sup>+</sup>]<sub>ext</sub></b>		
WT EAAT2 (140 mM/35 mM [Na <sup>+</sup> ])	6/6	0.3373 (ns)
WT EAAT2 (140 mM/0 mM [Na <sup>+</sup> ])	6/6	0.7387 (ns)
A362D EAAT2 (140 mM/35 mM [Na <sup>+</sup> ])	9/9	0.6545 (ns)
A362D EAAT2 (140 mM/0 mM [Na <sup>+</sup> ])	9/9	0.5235 (ns)
L85D EAAT2 (140 mM/35 mM [Na <sup>+</sup> ])	6/6	<0.0001 (***)
L85D EAAT2 (140 mM/0 mM [Na <sup>+</sup> ])	6/6	<0.0001 (***)
S288D EAAT2 (140 mM/35 mM [Na <sup>+</sup> ])	13/13	0.0112 (*)
S288D EAAT2 (140 mM/0 mM [Na <sup>+</sup> ])	13/13	<0.0001 (***)
R476M EAAT2 (140 mM/35 mM [Na <sup>+</sup> ])	8/8	0.3005 (ns)
R476M EAAT2 (140 mM/0 mM [Na <sup>+</sup> ])	8/8	0.0290 (*)
<b>Figure S7B: Reversal potential shift following changes in [Na<sup>+</sup>]<sub>ext</sub></b>		
V101D EAAT4 (140 mM/35 mM [Na <sup>+</sup> ])	4/4	0.6842 (ns)
L104D EAAT4 (140 mM/35 mM [Na <sup>+</sup> ])	5/5	0.5976 (ns)
N297D EAAT4 (140 mM/35 mM [Na <sup>+</sup> ])	4/4	0.7136 (ns)

All statistical evaluations are based on the two-tailed, unpaired, Student's t-test.